

**To:** Burdick, Melanie[Burdick.Melanie@epa.gov]  
**Cc:** Pennala, Virginia (DEQ)[PENNALAV@michigan.gov]; Wilson, Kristina (DEQ)[WilsonK17@michigan.gov]; Casey, Steve (DEQ)[CASEYS@michigan.gov]  
**From:** Hansen, Linda (DEQ)  
**Sent:** Wed 9/6/2017 7:43:02 PM  
**Subject:** FW: Back 40 Mine; 100-Year Floodplain Stage and Geotechnical Integrity of River Banks  
[M-100-year Floodplain Delineation.pdf](#)  
[Menominee River Flood Study all pages.pdf](#)  
[Menominee River Flood Study Page 9A.PDF](#)

Hi Melanie,

I am forwarding the email below and attachment as follow-up to your meeting last Friday with MI DEQ WRD, Aquila and their consultant. The email was sent by me to Joe Maki, who is a mining specialist with the DEQ Office of Oil, Gas & Minerals. The email summarizes concerns about the structural stability of the proposed Back 40 mine pit wall, specifically under Menominee River flood conditions up to the 100 year flood stage.

In the attached pdf, cross-section D-D' particularly illustrates this concern. It is my understanding, based on verbal communication with Joe, that structural stability of the pit wall under flood conditions was not specifically evaluated within the Part 632 review process. It is also my understanding that the "cutoff wall" is a vertical slurry wall and is not designed to provide structural support. Hydrostatic pressures as well as saturation/liquefaction of soils within the pit wall/river bank are both of concern.

This information is being provided for your use. Please let me know if you have any questions.

Thank you,

Linda D. Hansen, PE PWS

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**From:** Hansen, Linda (DEQ)

**Sent:** Friday, July 21, 2017 5:17 PM

**To:** Maki, Joe (DEQ) <[MAKIJ3@michigan.gov](mailto:MAKIJ3@michigan.gov)>

**Subject:** Back 40; 100-Year Floodplain Stage and Geotechnical Integrity of River Banks

Hello Joe,

Per our telephone conversation today I am sending you an email with the results of Aquila's 100-year floodplain analysis ("M-100-year Floodplain Delineation.pdf") and a copy of the September 1992 USACE Section 206 flood study of the Menominee River that Aquila's analysis is based on (Page 9A of the study is provided separately).

I have reviewed Aquila's 100-year floodplain analysis and find that their 1% (100-year) flood elevation determinations are accurate with respect to the USACE study, per my review under Part 31 of NREPA.

➔ My concern and question for you is this: In review of cross-sections B-B', C-C' and D-D' in Aquila's report, it is apparent that at the 100-year flood stage, an approximate static water depth of 15 feet would exist on the waterward side of the bluff that divides the river and the proposed mine pit. The apparent width of this separating bluff appears to be 300 feet at minimum (see x-sec D-D'), and I am wondering if the Part 632 geotechnical evaluation of the integrity of the pit wall included consideration of hydrostatic pressure during flood events?

○ As we discussed – the presence of bedrock vs. unconsolidated material within the "bluff divider" would affect its ability to retain structural integrity during saturation & increased hydrostatic pressure. Also assumptions about the operation of the upstream dam(s) would come into play as well.

Please note that the USACE study is based on data from USGS Gage Stations, bridge opening geometries, National Flood Insurance Program maps, and the headwater and tailwater rating curves for all of the dams along the river in Menominee County. (Per the narrative at the beginning of the study.)

This item of concern does not relate to my review under Part 31 of NREPA (i.e. I have no concern for the 100 year flood 'overtopping' the bluffs, or for any sort of Harmful Interference in general) but is something of general concern that I thought should be addressed if it has not been.

Thank you for your consideration,

Linda D. Hansen, PE PWS

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